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ABSTRACT

To assist educators and employers in manpower planning and development, this study attempted to provide a useful and comprehensive picture of the number and kinds of occupational skills needed in Arkansas in the next decade. The study estimated future manpower needs by applying a target year industry-occupational matrix to industry employment projections and aggregating the results. A technique for ascertaining critical skill shortages based on employment service data on unfilled job openings was used to determine short-range training requirements. Basic assumptions of the study were that the State must continue to experience a small net immigration until 1975 and an unemployment rate no higher than 4.0 percent. A recent study by the Industrial Research and Extension Center showed that 149,000 persons could benefit from some form of training or education. Tables with information about unfilled openings, employment projections, and employment estimates by major occupational groups are included in the report. A survey of vocational school performance and an evaluation of programs and recommendations are available as VT 010 562 and VT 010 560. [Not available in hard copy due to marginal legibility of original document.] (BC)

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EVALUATION OF
ARKANSAS VOCATIONAL TRAINING PROGRAMS
IN RELATION TO
ECONOMIC DEVELOPMENT

PART I: OCCUPATIONAL NEEDS AND EMPLOYMENT PROJECTIONS

Prepared for the

ARKANSAS STATE DEPARTMENT OF EDUCATION

By the

Industrial Research and Extension Center
College of Business Administration
University of Arkansas

and the

W. E. Upjohn Institute for Employment Research

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PART I - OCCUPATIONAL NEEDS AND EMPLOYMENT PROJECTIONS

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FOREWORD

This is the first report on a three-part study of Arkansas' vocational training needs as they relate to the State's economic development problems. It was undertaken as a result of widespread recognition, by both public officials and private business leaders, that a more carefully planned strategy for vocational education efforts is necessary if economic growth in Arkansas is to reach its maximum potential.

The results of this study are presented in three reports:

Part I - Occupational Needs and Employment Projections

Part II - Survey of Vocational Schools' Performance

Part III - Evaluation of Programs and Recommendations

Special acknowledgement is made to all members of the State and Regional Manpower Advisory Councils, which were organized early in the conduct of this study, for their cooperation, assistance, and enthusiasm throughout the year long project.

The work was carried on in close cooperation with the Arkansas State Department of Education and the State's Employment Security Division; and received the benefit of much valuable assistance from numerous staff members of both agencies. Credit is also due to many other individuals for the advice and encouragement which they provided.

Barton A. Westerlund, Director
Industrial Research and Extension Center

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OCCUPATIONAL NEEDS AND EMPLOYMENT PROJECTIONS

INTRODUCTION

Economic progress and industrial growth are dependent upon the properly balanced use and development of natural resources, capital goods, technology, human resources, and the economic organization to mesh all of these together. Any imbalance in the utilization of these resources, such as large numbers of unemployed or underemployed people--the current situation in Arkansas--both inhibits growth and constitutes a costly economic burden. Unless Arkansas can provide the kinds of workers in the numbers needed by employers, it will be unable to compete effectively for new industries or even retain many of those now operating in the State.

Therefore, for Arkansas to effectively continue its drive for economic equality with the rest of the Nation it must have a work force both broadly educated as citizens, and highly trained as workers in order for them to understand and adjust to technological change. The people must face up to the need for making changes, both in their occupation and in the place they work; for, as is so well stated in Tomorrow's Manpower Needs:[1]

> "In a rapidly changing economy, affected by revolutionary technological innovations, the occupational composition of the work force, as well as the skills required in each occupation are bound to change radically over the years."

Due to these rapid changes in technology, present manpower requirements of industry are an uncertain guide to future needs. To plan education and training programs to meet tomorrow's manpower needs, planners must have projections of tomorrow's manpower requirements. Such projections should also prove useful in the vocational guidance of young people and the structurally unemployed. To the extent that education, training and vocational guidance accurately reflect manpower requirements, imbalances between manpower needs and labor supply can be reduced; the productivity, and thus the earning power of workers enhanced; and structural unemployment minimized.

This study is an attempt to provide a useful and comprehensive picture of the number and kinds of occupational skills needed by employers in Arkansas now and for the next decade. Its purpose is to assist educators and others charged with manpower development in Arkansas, to use all available educational and training funds and facilities more effectively.

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[1]United States Department of Labor, Bureau of Labor Statistics, Tomorrow's Manpower Needs, preliminary draft, 1968, p. iii.

MANPOWER NEEDS FOR ECONOMIC DEVELOPMENT

Many questions are being raised and evaluations made of the State's training goals and the techniques for determining these goals. It is quite apparent that occupational job market information sources should be extended and improved if vocational educators are to be provided with the data which will enable them to plan the kind of vocational training which contributes directly to the economic development of Arkansas.

The orientation of occupational education to the State's economic development is an approach which implies that emphasis should be placed on the needs of basic industries (primarily manufacturing), in contrast to training for other types of industry, such as trade and services. If this goal is actively pursued, Arkansas' occupational training program can be a major contributant to the industrial and economic development of the State.

Present Methods of Determining Needs

The Vocational Education Act of 1963 assigned to the U. S. Employment Service and its affiliated state employment services the responsibility of providing job market information to vocational education school authorities. The purpose of the employment service's program is to insure that persons are provided training in occupations that will provide the best opportunities for their continued employment. To date, the area skill survey approach has been primarily relied upon to accomplish this goal in Arkansas.

In addition, each of the State's area vocational-technical schools has established advisory committees composed of business and industry leaders to review and evaluate its training programs.

Recommended Methods of Determining Needs

Although the efforts of the employment service and the school advisory committees have been useful, more extensive and more reliable sources of occupational job market information need to be developed. Arkansas, with limited public financing, cannot afford all types of useful programs, however desirable this might be. Instead, educational funds must be spent strategically; that is, programs must be emphasized that will yield the greatest benefit per dollar spent. This does not mean that training programs should be oriented solely to the needs of the basic industries; certainly, training needs of other business enterprises should also be recognized. In addition, some consideration has to be given to the training preferences and job choices of students. The approach does imply, however, that priorities of training be established that will yield the biggest payoff in

terms of job creation and in accelerating the State's economic development. Inherent in this implication is the premise that training dollars should be concentrated more heavily on skills needed in manufacturing than on those needed by other industries.

This orientation of vocational-technical education to the economic development of the State requires more comprehensive and more reliable labor market information than is now available. Industry growth patterns and critical skill needs must be ascertained and compared with the available labor supply in order to determine the priorities of training that will be most effective in satisfying those needs, and in accelerating economic development in the State.

Manpower Forecasting

One method of estimating future manpower requirements and training needs is to apply a target year industry-occupational matrix to industry employment projections, and aggregate the results. These results, when combined with estimates of replacement needs, can be utilized to determine critical occupational shortages.

Utilization of this technique identified the occupational clusters shown in Table I, on the following page, as critical in terms of training needed to provide skilled manpower to meet Arkansas' expanding employment.

The training time requirements for these occupational clusters range from a six to 12 month post-high school training period to two years for an associate degree program. Only those occupations for which training is or could be available in the State's area vocational-technical schools, technical institute or community colleges are shown in Table I. Similar information on occupations for which four or more years of college training is required is included in Table XII, page 31.

Not included in the critical shortages are a number of occupations with relatively large expansion and replacement needs, but which are low paying, involve poor working conditions, or for which only limited training is required. Many of these are in the service sector; such occupations as private household workers, practical nurses, waiters, cooks and bartenders.

Unfilled Job Openings Technique

Projections of employment by industry and occupation are most useful in establishing relatively long-range training priorities. Since manpower needs are constantly changing with changing technology and industry structure, other means should be used for determination of more immediate needs. The identification of short-range training requirements can best be accomplished on

TABLE I

ARKANSAS CRITICAL MANPOWER REQUIREMENTS

Occupation	1965-1975 Total Requirements	1965-1975 Annual Average
Total	66,176	6,617
Technical and kindred workers	5,644	565
Engineering technicians	1,079	108
Chemical	76	8
Civil	456	45
Electrical	227	23
Industrial	174	17
Mechanical	146	15
Chemical technicians	225	23
Dietitians and nutritionists	122	12
Draftsmen	448	45
Medical and dental technicians	1,461	146
Nurses, diploma and A.A. degree	2,309	231
Clerical and kindred workers	15,023	1,503
Stenographers, typists and secretaries	8,859	886
Office machine operators	1,417	142
Accounting clerks and bookkeepers	4,747	475
Craftsmen and kindred workers	18,310	1,829
Construction craftsmen	11,695	1,169
Carpenters	4,683	468
Brickmasons, stone and tile setters	638	64
Electricians	1,117	112
Excavating and grading machine operators	2,569	257
Painters and paper hangers	1,326	132
Plumbers and pipefitters	1,362	136
Metalworking craftsmen, excluding mechanics	1,399	139
Millwrights	375	37
Skilled machining workers	901	90
Tookmakers, diemakers, and setters	123	12
Mechanics and repairmen	5,216	521
Maintenance mechanics, industrial	1,221	122
Motor vehicles mechanics	3,995	399
Operatives and kindred workers	27,199	2,720
Assemblers, metalworking class A and B	1,983	198
Bus, truck, and tractor drivers	18,136	1,814
Inspectors, metalworking class B	1,002	100
Machine tool operators class B	988	99
Sewers and stitchers manufacturing	3,087	309
Welders and flame cutters	2,003	200

Source: Derived from Table XII.

a recurrent basis by the application of a technique for ascertaining critical skill shortages which is based on employment service data on unfilled job openings, known as ES-240 data.[2]

Unfilled job openings data, if properly recorded and reported by each of the Arkansas Employment Service area offices, can provide an excellent index of employer needs. Such data can be used to determine critical shortage occupations caused by a lack of qualified applicants, and to show the intensity of those shortages. Not all unfilled openings are due to a lack of qualified applicants, however. Some shortages, particularly those of many of the State's trade and service industries, are caused by low wage rates and/or poor working conditions.

Information based on unfilled job opening surveys can be useful to vocational educators in planning curricula for the immediate future and in establishing training priorities. The technique may also have long-range applications if the shortages are found to persist over long periods and if they are of sufficient intensity.

Utilization of this method in Arkansas is currently limited because only the Little Rock-North Little Rock and West Memphis areas are collecting and recording the data. Despite the data limitations, application of the "Medvin Approach" in this study did succeed in identifying a number of occupations which can be classified as being in critical shortage because of the lack of qualified applicants--at least in the Little Rock-North Little Rock area. However, examination of job cancellation data in local offices not reporting ES-240 information, interviews with employment service counselors, and interviews with employers throughout the State, revealed a very similar pattern of occupational shortages elsewhere.

A total of 15 professional, technical, and managerial occupations was identified as being shortage occupations. It should be noted that most of these require substantial educational preparation, usually at the college, junior college, or technical institute level. All of them were due to a lack of qualified applicants. In addition, on the national level, all except one are growing rapidly. (See Table II.)

A total of 21 shortage occupations were identified in the clerical and sales category (see Table III). While the majority of them are rapid growth occupations, a number were classified as shortages because of low wages and method of pay, rather than a lack of qualified applicants.

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[2]The method referred to is the "Medvin Approach." Mr. Norman Medvin, of the U. S. Employment Service, developed and tested the technique. His article entitled "Occupational Job Requirements: A Short-Cut Approach to Long-Range Forecasting," published in the January-February 1967 issue of the Employment Service Review, describes the methodology.

TABLE II

PROFESSIONAL, TECHNICAL, AND MANAGERIAL OCCUPATIONS
UNFILLED OPENINGS INFORMATION, LITTLE ROCK-NORTH LITTLE ROCK

Occupations	DOT Code	Continuing Shortages[1]	Percent Intensity of Shortage[2]	Employment Forecast in 1975[3]	Comments
Professional, technical, and managerial					
Electrical engineering	003	1-5	100	rapid	Lack of qualified applicants
Civil engineering	005	1-5	100	moderate	Lack of qualified applicants
Mechanical engineering	007	6-10	33-100	rapid	Lack of qualified applicants
Chemical engineering	008	1-5	100	rapid	Lack of qualified applicants
Industrial engineering	012	6-10	50-100	rapid	Lack of qualified applicants
Draftsmen, n.e.c.	017	1-5	50	rapid	Lack of qualified applicants
Mathematics	020	1-5	50	rapid	Lack of qualified applicants
Chemistry	022	1-5	100	rapid	Lack of qualified applicants
Medical and dental tech.	078	1-5	50-100	rapid	Lack of qualified applicants
Accountants and auditors	160	6-10	40-73	rapid	Lack of qualified applicants
Administrative specialization, n.e.c.	169	1-5	50	rapid	Lack of qualified applicants
Manufacturing industry managers and officials	183	1-5	50-100	rapid	Lack of qualified applicants
Wholesale and retail trade managers and officials	185	1-5	50-100	rapid	Lack of qualified applicants
Finance, insurance, and real estate managers and officials	186	1-5	50-100	rapid	Lack of qualified applicants
Service industry managers and officials	187	1-5	100	rapid	Lack of qualified applicants

[1] Continuing Shortage--Number of openings by size grouping that were unfilled at the end of each quarter. It represents the continuing need for workers.

[2] Percent Intensity of Shortage --Indicates, for each occupational group shown, the proximate proportion of hard-to-fill jobs to total openings. This means that they were on hand for 30 days or more, and remained unfilled at the end of each quarter.

[3] Employment Forecast to 1975--This is the national forecast of growth shown by the Occupational Outlook Handbook. This refers to the growth rates, not replacements. A "rapid" increase implies a gain of 25 percent or more, "moderate" implies a 15 to 24 percent increase, and "slow" refers to a 5 to 14 percent increase.

TABLE III

CLERICAL AND SALES OCCUPATIONS
UNFILLED OPENINGS INFORMATION, LITTLE ROCK-NORTH LITTLE ROCK

Occupations	DOT Code	Continuing Shortages[1]	Percent Intensity of Shortage[2]	Employment Forecast in 1975[3]	Comments
Secretary	201	6-10	30-50	rapid	Lack of qualified applicants
Stenographer	202	6-10	30-40	rapid	Lack of qualified applicants
Typist	203	1-5	30-100	rapid	Lack of qualified applicants
File clerk	206	1-5	50-100	rapid	Lack of qualified applicants
Clerk typist	209	1-5	30	rapid	Lack of qualified applicants
Tellers	212	1-5	50-100	rapid	Lack of qualified applicants
Account clerk	219	1-5	30	rapid	Lack of qualified applicants
Production clerk	221	1-5	100	moderate	Lack of qualified applicants
Shipping and receiving clerk	222	1-5	40-100	moderate	Lack of qualified applicants
Telephone operator	235	1-5	34-50	slow	Lack of qualified applicants
Receptionist and information clerk	237	1-5	30-50	rapid	Lack of qualified applicants
Collector	240	1-5	34-100	moderate	Low wages or method of pay and lack of applicants
Adjuster	241	1-5	50-100	moderate	Lack of qualified applicants and method of pay
Credit clerk	249	1-5	30	rapid	Lack of qualified applicants
Salesman, real estate & insurance	250	1-5	34-100	rapid	Lack of qualified applicants and method of pay
Salesman, services, n.e.c.	259	1-5	100	rapid	Lack of qualified applicants and method of pay
Salesman, food	262	1-5	50	rapid	Lack of qualified applicants and method of pay
Salesperson, shoes	263	1-5	34-50	rapid	Lack of qualified applicants and method of pay
Salesman, business machinery, equipment, and supplies	281	6-10	40-50	rapid	Lack of qualified applicants
Salesman and salesperson, commodities, n.e.c.	289	11-15	30-50	moderate	Lack of qualified applicants and method of pay
Salesman--driver	292	1-5	34	rapid	Lack of qualified applicants and method of pay

1, 2, 3 - See footnotes at end of Table II.

Only eight shortage occupations were identified in the service category (see Table IV). Without exception, the shortages were due to low wages, unstable work, or unfavorable working conditions. Although a majority of the service occupations are in the rapid growth category nationally, training for them should not receive high priority in light of the training goals presented earlier in this report.

In the processing, machine trades, bench work, structural and miscellaneous occupations, a total of 26 shortage categories were identified (see Table V). All of them were due to a lack of qualified applicants. In Arkansas, these occupations will likely constitute major growth opportunities, although the majority of them are forecast to grow only moderately nationally.

Procedures. As noted earlier, the primary source of information used to illustrate the unfilled job openings approach was ES-240 data collected by the Arkansas Employment Security Division (ESD). Quarterly reports of unfilled job openings by three-digit DOT (Dictionary of Occupational Titles) occupations were used for four quarters in 1967 and the first quarter of 1968. In addition to the ES-240 data, supplemental sources included job cancellation information and employer interviews. The occupational outlook information for 1975 was taken from the Occupational Outlook Handbook, 1966-1967 edition, and from the Bureau of Labor Statistics occupational-industry matrix presented in Tomorrow's Manpower Needs, cited elsewhere in this study.

The specific procedures used in the analysis:

(1) Tabulations were made from ES-240 quarterly reports for the last day of the months of February, May, August, and November 1967, and February 1968.

(2) The data tabulated included the number of unfilled openings at the end of each quarter, the number unfilled for one month or more, and the percentage of openings on file for 30 days or more ("hard-to-fill" openings).

(3) The unfilled openings tabulations were reviewed to develop a list of occupations indicating shortages over a period of time. The major problem in the development of the list of shortage occupations was to make judgments when the number of openings was very small. It was assumed if the local office could not fill its openings because of the unavailability of workers, regardless of volume, that there was a shortage.

(4) A few occupations were added to the preliminary list on the basis of employer interview and job cancellation data.

(5) Continuing shortages were defined as the number of openings by size grouping that were on hand unfilled at the end of each quarter. It represents the continuing need for workers.

(6) Percent intensity of shortages was calculated as the proximate proportion of hard-to-fill jobs to total openings, by occupational grouping.

TABLE IV

SERVICE OCCUPATIONS
UNFILLED OPENINGS INFORMATION, LITTLE ROCK-NORTH LITTLE ROCK

Occupations	DOT Code	Continuing Shortages[1]	Percent Intensity of Shortage[2]	Employment Forecast in 1975[3]	Comments
Day worker	301	1-5	30	rapid	Low pay and unstable work
Housekeeper	303	1-5	30-40	rapid	Low pay and unstable work
Maids, domestic	306	11-15	31-75	rapid	Low pay and unstable work
Nursemaids	307	6-10	34-67	rapid	Low pay and unstable work
Nurse's Aide--Orderly	355	1-5	30-50	rapid	Lack of qualified applicants and low pay
Laundering	361	1-5	50-100	moderate	Low pay and unfavorable working conditions
Porter	381	1-5	30-50	rapid	Low pay
Janitor	382	1-5	30-50	rapid	Low pay and unfavorable working conditions

1, 2, and 3 - See footnotes at end of Table II.

TABLE V

PROCESSING, MACHINE TRADES, BENCH WORK, STRUCTURAL AND MISCELLANEOUS OCCUPATIONS
UNFILLED OPENINGS INFORMATION, LITTLE ROCK-NORTH LITTLE ROCK

Occupations	DOT Code	Continuing Shortages[1]	Percent Intensity of Shortages[2]	Employment Forecast in 1975[3]	Comments
Processing					
Mixing, compounding, blending, kneading, shaping and related	520	1-5	100	moderate	Lack of qualified applicants
Coating, calendering, laminating and finishing	554	1-5	100	rapid	Lack of qualified applicants
Wood preserving and related	561	1-5	100	moderate	Lack of qualified applicants
Machine Trades					
Machinists and related	600	1-5	100	moderate	Lack of qualified applicants
Abrading operations	603	1-5	100	moderate	Lack of qualified applicants
Turning operations	604	1-5	30-100	moderate	Lack of qualified applicants
Motorized vehicle equipment repairmen	620	1-5	40-50	rapid	Lack of qualified applicants
Engine, power transmissions, and related mechanics	625	1-5	100	moderate	Lack of qualified applicants
Business and commercial machine repairmen	633	1-5	100	rapid	Lack of qualified applicants
Utilities service mechanics and repairmen	637	1-5	100	moderate	Lack of qualified applicants
Miscellaneous machine installation	638	1-5	100	rapid	Lack of qualified applicants
Printing press	651	1-5	100	slow	Lack of qualified applicants
Bench Work					
Metal unit assemblers	706	1-5	34	slow	Lack of qualified applicants
Television repair	720	1-5	100	rapid	Lack of qualified applicants
Winding and assembling coils	724	1-5	100	moderate	Lack of qualified applicants
Assembly and repair of electrical equipment	729	1-5	50-100	moderate	Lack of qualified applicants
Sewing machine operator	786	1-5	50-100	moderate	Lack of qualified applicants
Structural Work					
Sheet metal worker	804	1-5	50-100	rapid	Lack of qualified applicants
Assembly and installation of transmission lines	821	1-5	100	moderate	Lack of qualified applicants
Assembly of household appliances	827	1-5	100	moderate	Lack of qualified applicants
Plumbers, pipe fitters, etc.	862	1-5	50-100	moderate	Lack of qualified applicants
Floor laying and finishing	864	1-5	100	moderate	Lack of qualified applicants
Miscellaneous structural work, n.e.c.	899	1-5	100	moderate	Lack of qualified applicants
Miscellaneous Work					
Trailer-truck drivers	904	1-5	100	rapid	Lack of qualified applicants
Material handler	929	1-5	30	slow	Lack of qualified applicants
Boring, drilling, and cutting	930	1-5	50-100	moderate	Lack of qualified applicants

1, 2, and 3 (See footnotes at end of Table II.)

(7) Employment Forecast to 1975 is based on the national forecast of growth by occupation in the Occupational Outlook Handbook. This refers to growth rates and not replacements. A "rapid" increase implies a gain of 25 percent or more, "moderate" implies a 15 to 24 percent increase and "slow" refers to a 5 to 14 percent increase.

Limitations. The major limitation for Statewide use of the unfilled job openings method is the lack of sufficient ES-240 data from each of the Arkansas ESD area offices. Data limitations also exist in certain occupational clusters when the number of openings is very small. These problems may be lessened to some extent by supplementing the ES-240 statistics with information gathered from job cancellation tabulations and employer interviews. Another limiting factor is that the unfilled openings data are reported by three-digit DOT occupations. Six-digit reporting would increase the usefulness of the information for school curriculum planning purposes.

Nevertheless, it is felt that the illustrative analysis presented for the Little Rock-North Little Rock area does accomplish two goals: First, the potential usefulness of the "Medvin Approach" in determining shortage occupations to be used in establishing training priorities is clearly shown. Second, the study identifies a number of shortage occupations where training is presently needed.

Recommendations. For the full potential of this technique to be realized, the following recommendations are made: First, that the Arkansas Employment Service require all area offices to collect and record complete ES-240 data. Second, that the data, whenever possible, be reported on the six-digit DOT level. Third, that the employment service offices actively solicit job-openings information from employers. Finally, that the ESD publish a quarterly report of selected occupational shortages, and annually publish a comprehensive report utilizing this approach. If implemented, these recommendations should result in the ESD being able to better fulfill its role as a vital source of occupational needs information for the State's educational and training institutions and agencies.

MANPOWER SUPPLY FOR ECONOMIC DEVELOPMENT

For the employment projections in this study to be realized, the State must continue to experience a small net in-migration of people between now and 1975, and the assumed overall unemployment rate of 4.0 must be attained. In addition, both male and female labor force participation rates in Arkansas must rise to near the 1967 national average. The average rate for the total population 16 years of age and over will have to increase from the State's 1960 level of 49 percent to more than 56 percent by 1975.

Recent labor surplus studies, by the Industrial Research and Extension Center, show that about 149,000 persons (31,000 unemployed and 118,000 underemployed) could benefit from some form of training that would upgrade or update their skills and/or education, while some 111,000 (the non-participants) are in need of job opportunities in their area, and corresponding skill training or remedial education. At the same time, in many areas of the State, substantial numbers of jobs are unfilled due to a lack of skilled workers.

It is only in recent years that recognition has been accorded the primacy of people in economic planning and development. In the past, planners concerned with "industrial development" have tended to place most of their emphasis on the utilization of other types of resources. Development of human resources was thought of as taking place in the normal chain of events accompanying industrial development. We now know that this does not necessarily occur without carefully designed education and training programs. People are Arkansas' most important resource--i.e., people who are industrious, have the ability to initiate change and to adapt to changing conditions. The ability to initiate change and to adapt to new situations is determined largely by the education and training of the individual. Therefore, in order for Arkansas to retain and develop its needed work force, it is essential that some agency engage in large-scale vocational and technical training activities. This not only requires expansion of facilities and programs for needed skill training, but remedial education as well. However, of equal importance must be a heavy commitment of effort to trainee recruitment, especially among the disadvantaged, and to job placement services for those completing their training. The problem is that there are too few qualified job-seekers. This is compounded by undesirable levels of unemployment and low work-force participation rates. Furthermore, serious underemployment and underparticipation is widespread throughout the State.

It would appear that the most logical agency in which to place the responsibilities described above would be the State Department of Education and its vocational and technical school system. Area schools are already established or are in the planning stage; they have an appropriate program

orientation; and they should be able to make needed changes in their curricula and methods of operation. Expansion and changes in these existing facilities would be less costly, and should have more long-term stability than the establishment of some new vocational education system.

EMPLOYMENT PROJECTIONS BY INDUSTRY

The industry employment statistics that appear in this study are presented in two somewhat different forms, each of which is related to a different series of employment data. Differences in coverage between these series must be understood for the reader to properly evaluate the information given.

State Projections

The current and projected State employment data shown in Table VI relate to labor force estimates prepared by the Arkansas Employment Security Division. The industry data shown represent the number of jobs in the economy and show only wage and salary workers. Excluded from these industry data, but presented as a separate category of workers, are the self-employed, unpaid family workers and domestics in households. Also, the data on government employment covers all civilian employment in government, regardless of service function. The ESD data are available in greater industry detail and for more past years than any other annual employment series and are, therefore, the best available statistics on which to base projections.

In Table VII, on the other hand, the data relate to census of population statistics, and the industry sections cover all workers, including wage and salary employees, self-employed, unpaid family workers and domestics. In addition, the data for government employment cover only those workers in public administration, i.e., the workers engaged in activities that are uniquely governmental in nature. Government employment in functions other than public administration is classified in the appropriate industrial classification--e.g., government education workers are included in educational services, government hospital workers are included in health services, and government construction workers are included in the construction industry.

This dual presentation of what is essentially the same information is required by the fact that the only available industry-occupational matrix is based on census statistics. At the same time, the ESD estimates are the best available continuous industry data, and are the series labor analysts are most familiar with. The way in which the projections of employment by industry reflect the changing industrial mix in Arkansas is shown in Figure 1 on page 17.

When new "benchmarks" become available from the 1970 Census of Population, revised estimates for 1970 and new projections for 1975 and 1980 should be prepared.

TABLE VII

ARKANSAS EMPLOYMENT PROJECTIONS, BY INDUSTRY TO 1980

(Bureau of the Census Concept)

Labor Force and Industry Division	Labor Force and Employment				
	1960	1965	1970	1975	1980
Civilian labor force	595,100	663,200	727,200[3]	800,300[3]	876,800[3]
Unemployed	40,000	34,700	29,100[3]	32,000[3]	35,100[3]
Unemployment rate	6.7	5.2	4.0	4.0	4.0
Employment	555,100[1]	628,500[2]	698,100	768,300	841,700
Agriculture	89,200	65,100	54,200	47,200	42,900
Nonagriculture	465,700	563,100	643,900	721,100	798,800
Manufacturing	109,850	142,760	175,600	203,700	229,400
Durable goods	57,680	73,970	91,980	109,090	124,480
Lumber	27,970	27,740	28,440	29,300	29,970
Furniture	8,010	10,320	11,930	14,040	16,040
Stone, clay and glass	3,760	4,170	4,390	4,700	5,110
Primary metals	2,010	3,210	4,810	5,510	6,010
Fabricated metals	3,510	5,640	7,410	9,900	11,980
Nonelectrical machinery	2,290	3,620	5,620	7,340	9,150
Electrical machinery	3,690	9,000	14,900	20,610	25,220
Transportation equipment	1,860	2,970	4,470	5,570	6,670
Boat building and repair	420	520	720	920	1,120
Other transportation equipment	1,440	2,450	3,750	4,650	5,550
Other durable goods	4,580	7,300	10,010	12,120	14,330
Nondurable goods	52,170	68,790	83,620	94,610	104,920
Food	18,580	22,390	26,320	29,180	32,150
Textiles	2,040	2,450	3,850	4,150	4,550
Apparel	8,790	14,000	15,900	18,510	20,520
Paper	6,510	6,810	8,210	8,710	9,110
Printing	3,900	6,060	7,580	8,810	10,060
Chemicals	4,310	5,240	7,220	8,800	10,380
Leather	5,020	7,120	8,220	8,530	8,830
Other nondurable goods	3,020	4,720	6,320	7,920	9,320
Nonmanufacturing	355,850	420,340	468,300	517,400	569,400
Mining	5,810	5,050	4,870	4,690	4,410
Coal	330	230	240	240	240
Crude petroleum and natural gas	3,250	2,670	2,180	1,990	1,800
Other mining	2,230	2,150	2,450	2,460	2,370
Construction	34,830	45,950	51,590	55,030	57,490
Transportation, communications and utilities	34,580	37,700	39,920	41,530	43,130
Transportation	21,360	23,480	25,080	26,140	27,200
Railroad transportation	8,300	6,920	6,430	6,540	6,650
Motor freight	7,830	9,950	11,230	11,730	12,240
Other transportation	5,230	6,610	7,420	7,870	8,310
Communications	4,810	5,130	5,340	5,540	5,650
Public utilities	8,410	9,090	9,500	9,850	10,280
Wholesale and retail trade	108,920	125,320	138,210	154,810	171,550
Wholesale trade	19,540	23,550	25,670	29,040	32,490
Retail trade	89,380	101,770	112,540	125,770	139,060
Finance, insurance, and real estate	16,340	21,040	25,420	29,550	33,660
Services	133,350	158,590	178,080	197,980	221,740
Hotels and other lodgings	6,490	7,540	8,550	9,390	10,420
Personal services, including private households	46,290	51,140	53,330	55,740	58,040
Miscellaneous business services	2,760	3,550	4,590	5,740	7,290
Repair services	9,630	11,070	12,360	13,590	15,010
Medical services	20,750	25,730	31,120	36,910	44,510
Educational services	32,540	39,420	44,820	50,670	57,020
Other services	14,890	20,140	23,310	25,940	29,450
Public administration	22,020	26,690	30,210	33,810	37,420

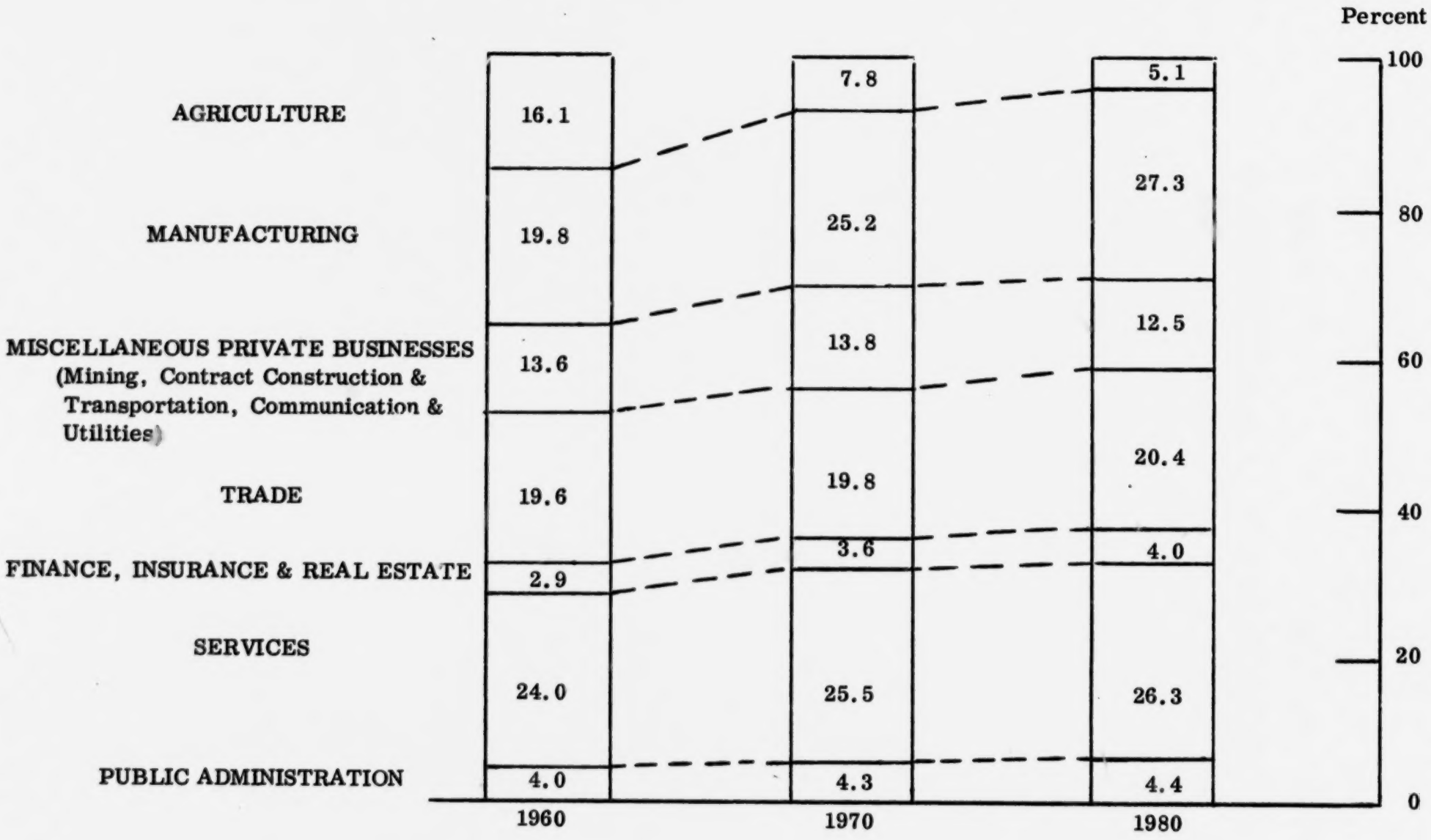
[1]Includes 200 persons engaged in labor disputes.

[2]Includes 300 persons engaged in labor disputes.

[3]Assuming an unemployment rate of 4.0.

FIGURE 1

PERCENT DISTRIBUTION OF ARKANSAS EMPLOYMENT, BY MAJOR INDUSTRY CATEGORIES
1960 AND PROJECTED 1970 AND 1980



Source: Derived from Table VII.

Regional Projections

Employment projections, corresponding to the State census related projections, for the eight Economic Development Districts in Arkansas are shown in Table VIII.

Because of the relatively small size of the labor force, and the diversity of employment by industry within the eight districts, projections for these regions are less reliable for forecasting purposes than are those for Arkansas as a whole--especially with regard to industry detail. Therefore, the district's projections are limited to the major industry groupings.

The map below shows the State's eight Economic Development Districts.

FIGURE 2

ECONOMIC DEVELOPMENT DISTRICTS OF ARKANSAS

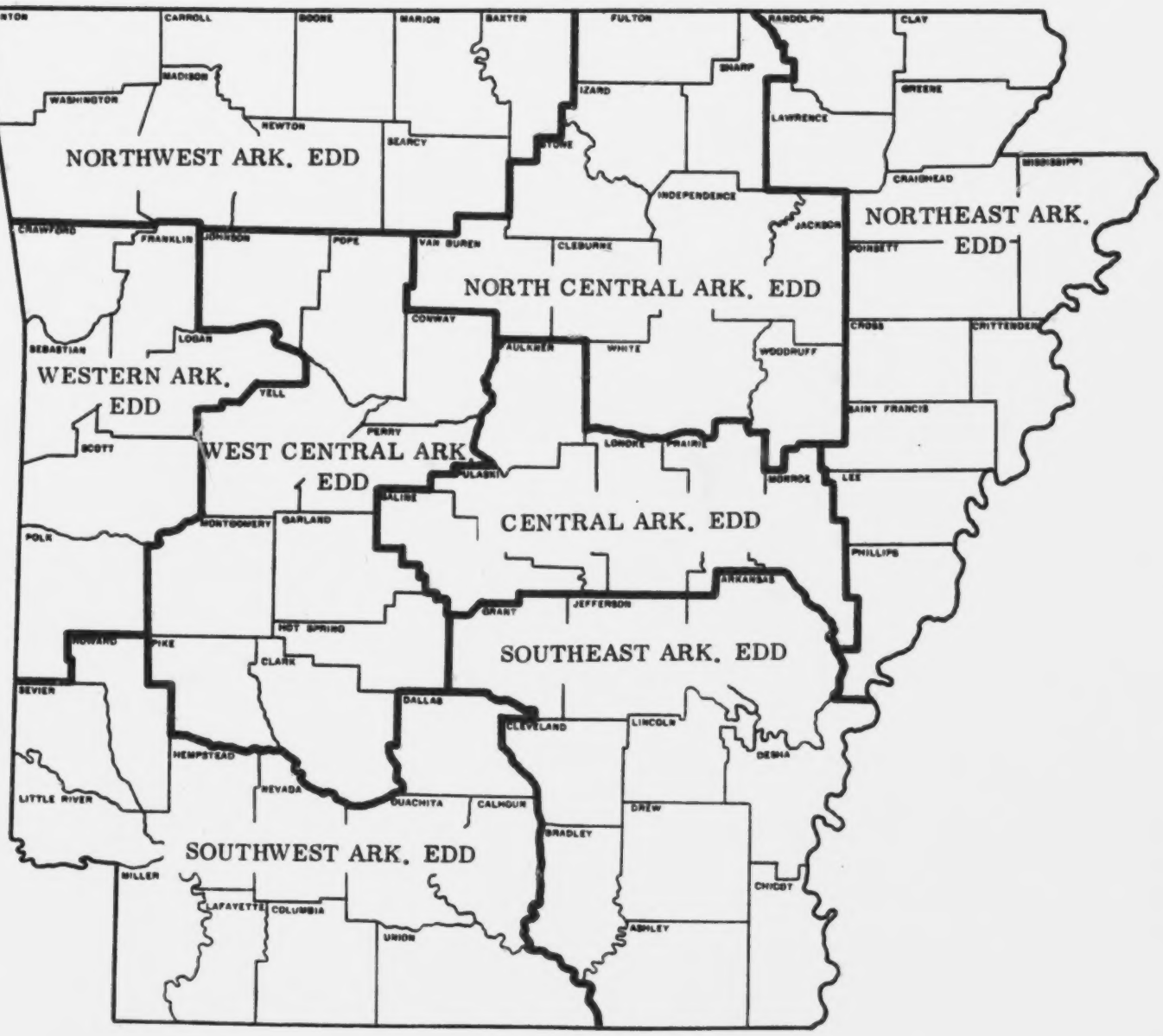


TABLE VIII

ARKANSAS REGIONAL EMPLOYMENT PROJECTIONS, BY ECONOMIC DEVELOPMENT DISTRICTS, TO 1980

(Bureau of the Census Concepts)

Region and Industry Division	Employment				
	1960	1965	1970	1975	1980
Northwest Arkansas EDD					
Employment	50,080	63,720	79,550	92,350	106,700
Agriculture	11,210	9,010	8,270	7,850	7,740
Nonagriculture	38,870	54,710	71,280	84,500	98,960
Manufacturing	10,230	16,310	23,640	29,310	35,320
Durable goods	3,280	5,700	8,990	11,780	14,760
Nondurable goods	6,950	10,610	14,650	17,530	20,560
Nonmanufacturing	28,640	38,400	47,640	55,190	63,640
North Central Arkansas EDD					
Employment	35,870	39,190	43,330	47,410	52,010
Agriculture	10,070	7,300	6,070	5,290	4,850
Nonagriculture	25,800	31,890	37,260	42,120	47,160
Manufacturing	5,210	7,390	9,830	11,810	13,770
Durable goods	3,150	4,130	5,220	6,230	7,170
Nondurable goods	2,060	3,260	4,610	5,580	6,600
Nonmanufacturing	20,590	24,500	27,430	30,310	33,390
Northeast Arkansas EDD					
Employment	112,030	114,520	118,300	124,950	132,070
Agriculture	33,150	23,520	19,220	16,850	15,570
Nonagriculture	78,880	91,000	99,080	108,100	116,500
Manufacturing	16,970	24,100	31,950	38,240	44,370
Durable goods	8,300	12,200	17,020	21,190	25,290
Nondurable goods	8,670	11,900	14,930	17,050	19,080
Nonmanufacturing	61,910	66,900	67,130	69,860	72,130
Southeast Arkansas EDD					
Employment	68,300	74,330	79,230	85,090	90,940
Agriculture	12,870	9,800	8,300	7,180	6,350
Nonagriculture	55,430	64,530	70,930	77,910	84,590
Manufacturing	16,640	18,240	18,500	19,290	19,280
Durable goods	8,930	9,410	9,300	9,690	9,520
Nondurable goods	7,710	8,830	9,200	9,600	9,760
Nonmanufacturing	38,790	46,290	52,430	58,620	65,310
Southwest Arkansas EDD					
Employment	69,580	75,330	78,040	82,680	86,810
Agriculture	6,290	4,700	4,010	3,720	3,660
Nonagriculture	63,290	70,630	74,030	78,960	83,150
Manufacturing	17,290	21,420	25,050	28,260	30,950
Durable goods	9,870	11,660	13,210	14,890	16,120
Nondurable goods	7,420	9,760	11,840	13,370	14,830
Nonmanufacturing	46,000	49,210	48,980	50,700	52,200
Western Arkansas EDD					
Employment	43,110	54,360	65,660	75,430	85,850
Agriculture	3,500	2,600	2,100	1,750	1,390
Nonagriculture	39,610	51,760	63,560	73,680	84,460
Manufacturing	11,830	15,050	18,140	20,900	23,420
Durable goods	6,870	8,880	11,090	13,160	15,130
Nondurable goods	4,960	6,170	7,050	7,740	8,290
Nonmanufacturing	27,780	36,710	45,420	52,780	61,040
West Central Arkansas EDD					
Employment	49,710	56,810	62,930	69,210	75,580
Agriculture	5,160	3,730	3,090	2,790	2,660
Nonagriculture	44,550	53,080	59,840	66,420	72,920
Manufacturing	11,250	14,630	18,010	20,830	23,390
Durable goods	6,530	7,600	8,490	9,490	10,180
Nondurable goods	4,720	7,030	9,520	11,340	13,210
Nonmanufacturing	33,300	38,450	41,830	45,590	49,530
Central Arkansas EDD					
Employment	126,220	149,940	171,060	191,180	211,740
Agriculture	6,950	4,440	3,140	1,770	680
Nonagriculture	119,270	145,500	167,920	189,410	211,060
Manufacturing	20,430	25,620	30,480	35,060	38,900
Durable goods	10,750	14,390	18,660	22,660	26,310
Nondurable goods	9,680	11,230	11,820	12,400	12,590
Nonmanufacturing	98,840	119,880	137,440	154,350	172,160

EMPLOYMENT PROJECTIONS BY OCCUPATION

This section presents information on Arkansas' employment trends and projections by occupation. The information is given in three parts:

(1) State employment estimates by major occupational groups, and by major occupational groups distributed by major industry categories.

(2) Employment estimates for the State's eight Economic Development Districts by major occupational groups.

(3) State employment estimates by detailed occupational listings.

Changing Occupational Structure

Significant changes have occurred and can be expected to continue in the occupational structure of Arkansas' labor force. Certainly the most drastic change since 1950 has been the decline of farmer and farm worker employment--between 1950 and 1965 employment in these occupations declined by nearly 75 percent, from more than 210.5 thousand to less than 60.1 thousand.[3] Because farmers and farm workers made up nearly 35 percent of total employment in 1950, the rapid decline in these occupations caused a decline in total employment that was not reversed until 1958; in fact, total employment in Arkansas did not regain its 1950 level until 1964.

The employment of nonfarm laborers also declined substantially between 1950 and 1965, dropping from 52.8 thousand to 40.3 thousand, a decrease of nearly 24 percent. However, total employment of blue-collar workers, craftsmen, foremen, and kindred workers, operatives and kindred workers, and nonfarm laborers grew quite rapidly. Employment in these occupations rose by nearly 44 percent, increasing from approximately 169.9 thousand to nearly 243.8 thousand. At the same time, employment in the white-collar worker group (professional, technical, and kindred workers; managers, officials, and proprietors; clerical and kindred workers; and sales workers), and in the service worker category grew even more rapidly. Between 1950 and 1965, white-collar employment increased by about one-half from 160.2 thousand to 236.3 thousand, with especially rapid growth occurring in the professional and clerical fields. Employment of service workers rose even faster, increasing by more than 91 percent for a gain of 42.0 thousand jobs.

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[3]The 1965 employment of farmers and farm workers was slightly less than total employment in the agriculture industry shown in Tables VI and VII because "agriculture" includes, in addition to the occupation "farmers and farm workers," a number of people in other occupations, e.g., professional workers such as veterinarians and clerical workers on large commercial farms (see Table X-A).

As illustrated by Figure 3 on the following page, these dramatic changes have resulted in an occupational employment structure for Arkansas that is more similar to the Nation's. The State is moving toward the national pattern in the managerial, clerical, craftsmen, service and farm categories; but there still exists notable differences from the national distribution for the professional and technical, sales, operative and laborer occupations.

Although many factors influence the occupational structure of the work force, the two most important ones for Arkansas are: (1) the different rates of employment growth among industries, as the State changes from a predominantly agricultural to a more diversified economy, and (2) the changing occupational patterns within separate industries, as the State builds a more diverse, complex, and sophisticated industrial structure.

These and other factors were taken into account in developing the occupational projections for this report.

State Projections by Major Occupational Groups

Table IX presents the employment estimates by major occupational groups for 1965 and 1975, with extensions to 1980. Also shown are both the expansion and replacement needs over the period 1965-1975, and the total annual average growth and replacement necessary to reach the projected 1975 totals. Estimates of the occupational replacement needs were made because the total requirement for training new workers will exceed the differences between the projected employment figures for 1975 and those recorded for 1965. This is due to the number of workers employed in 1965 who will leave the labor force or die by 1975.

The major occupational groups, distributed by major industry categories for 1960, 1965, 1970, and 1975, with extensions to 1980, are shown in Tables X-A through X-E.[4] These tables show clearly, by industry, the continually occurring changes in occupational structure. The unrounded data in these tables are presented for convenience, and are not intended to indicate accuracy.

These projections of occupational requirements indicate an increase of nearly 29 percent for white-collar workers between 1965 and 1975. Among white-collar occupations, the most rapid increase will be for professional and technical workers, and for clerical workers, both of which are expected to grow much more rapidly (34 and 33 percent, respectively) than the average for all workers (22 percent). The need for sales workers, and managers and officials should rise about 26 and 22 percent, respectively.

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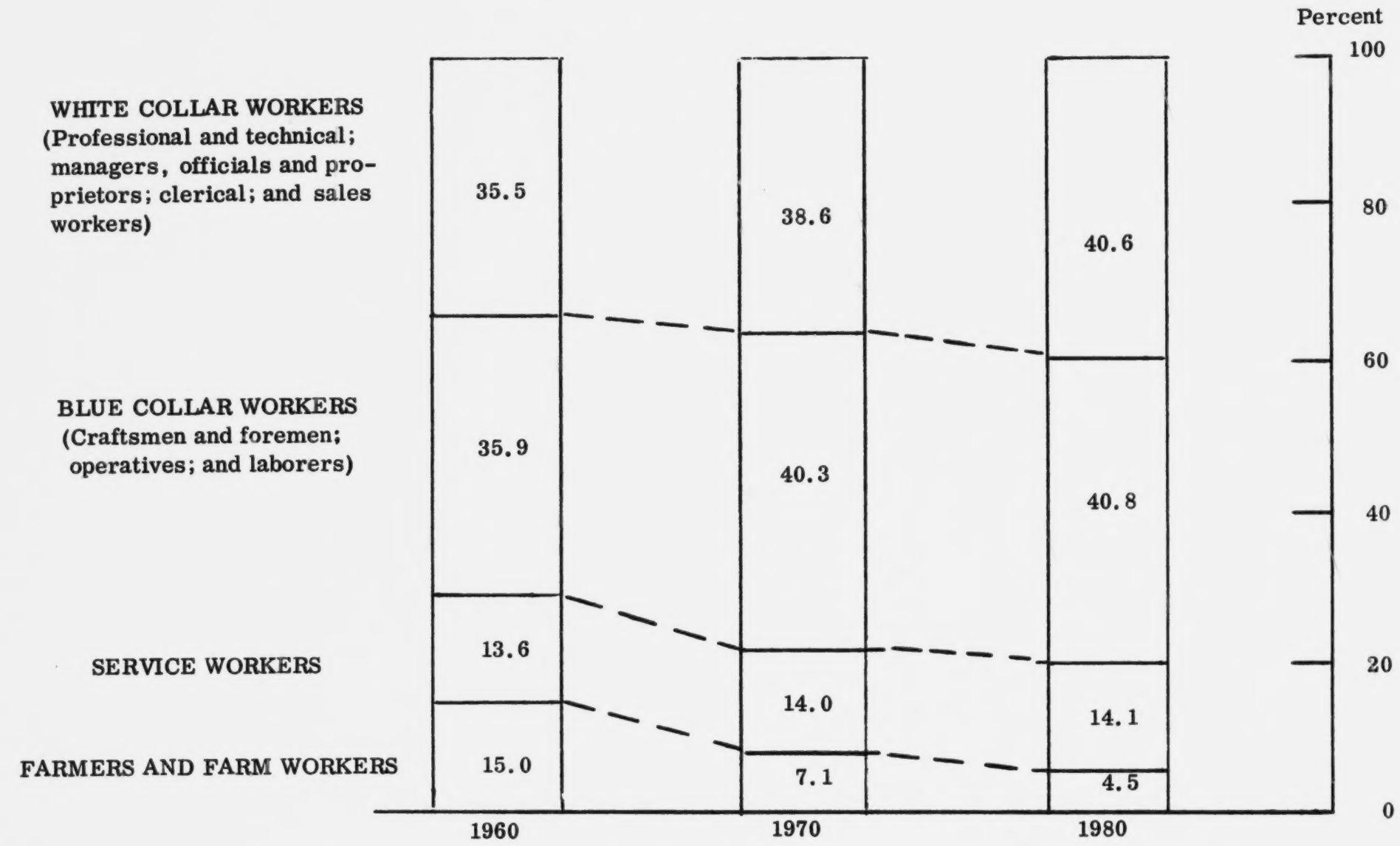
[4]As was noted for the industry employment projections, revisions of these occupational employment projections should be prepared shortly after the 1970 Census of Population becomes available, so that related planning efforts may be as realistic and accurate as possible.

FIGURE 3

PERCENT DISTRIBUTION OF ARKANSAS EMPLOYMENT, BY MAJOR OCCUPATIONAL GROUPS
1960 AND PROJECTED 1970 AND 1980



Source: Derived from Tables X-A, X-C and X-E.

TABLE IX

ARKANSAS EMPLOYMENT ESTIMATES AND MANPOWER NEEDS, BY MAJOR OCCUPATIONAL GROUPS, 1965 AND 1975
WITH EMPLOYMENT EXTENDED TO 1980

Occupation	Employment 1965 Number	Employment 1965 Percent	Employment 1975 Number	Employment 1975 Percent	Manpower Needs, 1965-1975 Expansion	Replacement	Total	Annual Average	Employment Extended to 1980 Number	Employment Extended to 1980 Percent
Professional and technical workers	61,780	9.8	82,771	10.8	20,991	15,445	36,436	3,644	95,128	11.3
Managers, officials and proprietors	62,063	9.9	75,486	9.8	13,423	15,516	28,939	2,894	81,989	9.7
Clerical workers	66,746	10.6	88,934	11.6	22,188	16,687	38,875	3,887	100,899	12.0
Sales workers	45,807	7.3	57,541	7.5	11,734	11,452	23,186	2,319	63,558	7.6
Craftsmen and foremen	80,641	12.8	103,131	13.4	22,490	20,160	42,650	4,265	113,344	13.5
Operatives	122,857	19.6	167,523	21.8	44,666	30,714	75,380	7,538	188,496	22.4
Laborers, except farm	40,098	6.4	42,818	5.6	2,720	10,024	12,744	1,274	41,554	4.9
Service workers	88,148	14.0	107,591	14.0	19,443	22,037	41,480	4,148	118,571	14.1
Farmers and farm workers	60,060	9.6	42,505	5.5	-17,555	15,015	-2,540	-254	38,161	4.5
Total employment	628,200	100.0	768,300	100.0	140,100	157,050	297,150	29,715	841,700	100.0

Note: Percents may not sum to 100.0 due to rounding.

TABLE X-A

ARKANSAS EMPLOYMENT ESTIMATES, BY MAJOR OCCUPATIONAL GROUPS, BY MAJOR INDUSTRY CATEGORIES, 1960

Occupation	Total	Agriculture	Manufacturing	Mining	Contract Construction	Transportation, Communications & Utilities	Trade		Finance	Services	Public Administration
							Wholesale	Retail			
Professional and technical workers	50,092	932	3,032	364	1,232	1,246	208	1,108	337	38,957	2,676
Managers, officials and proprietors	53,547	1,152	5,905	423	2,819	2,810	4,377	22,121	3,743	6,704	3,493
Clerical workers	54,446	607	7,288	376	1,030	6,969	3,208	7,697	6,378	10,709	10,184
Sales workers	39,044	73	3,949	16	88	207	4,391	25,038	4,486	764	32
Craftsmen and foremen	65,125	1,064	16,007	1,496	19,947	7,578	1,323	6,917	294	9,343	1,156
Operatives	98,840	1,841	53,998	3,025	3,794	11,599	4,484	10,798	55	8,650	596
Laborers, except farm	35,149	-	17,729	-	5,772	3,538	1,362	2,590	288	3,316	554
Service workers	75,379	253	1,942	110	148	633	187	13,111	759	54,907	3,329
Farmers and farm workers	83,278	83,278	-	-	-	-	-	-	-	-	-
Total employment	554,900	89,200	109,850	5,810	34,830	34,580	19,540	89,380	16,340	133,350	22,020
	Percent Distribution										
Professional and technical workers	9.0	1.0	2.8	6.3	3.5	3.6	1.1	1.2	2.1	29.2	12.2
Managers, officials and proprietors	9.7	1.3	5.4	7.3	8.1	8.1	22.4	24.7	22.9	5.0	15.9
Clerical workers	9.8	0.7	6.6	6.5	3.0	20.2	16.4	8.6	39.0	8.0	46.2
Sales workers	7.0	0.1	3.6	0.3	0.2	0.6	22.5	28.0	27.5	0.6	0.2
Craftsmen and foremen	11.7	1.2	14.6	25.8	57.3	21.9	6.8	7.7	1.8	7.0	5.3
Operatives	17.8	2.1	49.2	52.1	10.9	33.5	23.0	12.1	0.3	6.5	2.7
Laborers, except farm	6.3	-	16.1	-	16.6	10.2	7.0	2.9	1.8	2.5	2.5
Service workers	13.6	0.3	1.8	1.9	0.4	1.8	1.0	14.7	4.6	41.2	15.1
Farmers and farm workers	15.0	93.4	-	-	-	-	-	-	-	-	-
Total employment	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: Percents may not sum to 100.0 due to rounding.

TABLE X-B

ARKANSAS EMPLOYMENT ESTIMATES, BY MAJOR OCCUPATIONAL GROUPS, BY MAJOR INDUSTRY CATEGORIES, 1965

Occupation	Total	Agriculture	Manufacturing	Mining	Contract Construction	Transportation, Communications & Utilities	Trade		Finance	Services	Public Administration
							Wholesale	Retail			
Professional and technical workers	61,780	924	4,541	359	1,768	1,449	290	1,254	442	47,203	3,550
Managers, officials and proprietors	62,063	911	7,759	362	3,906	3,017	5,180	23,693	5,079	7,820	4,336
Clerical workers	66,746	467	9,752	344	1,468	7,361	3,904	9,374	8,213	13,953	11,910
Sales workers	45,807	71	5,334	14	122	232	5,201	28,226	5,668	901	38
Craftsmen and foremen	80,641	998	21,361	1,316	25,787	8,244	1,826	8,300	385	11,012	1,412
Operatives	122,857	1,472	71,553	2,560	5,574	13,160	5,415	12,760	67	9,628	668
Laborers, except farm	40,098	-	20,114	-	7,128	3,595	1,525	2,852	355	3,930	599
Service workers	88,148	197	2,346	95	197	642	209	15,311	831	64,143	4,177
Farmers and farm workers	60,060	60,060	-	-	-	-	-	-	-	-	-
Total employment	628,200	65,100	142,760	5,050	45,950	37,700	23,550	101,770	21,040	158,590	26.690
	Percent Distribution										
Professional and technical workers	9.8	1.4	3.2	7.1	3.9	3.8	1.2	1.2	2.1	29.8	13.3
Managers, officials and proprietors	9.9	1.4	5.4	7.2	8.5	8.0	22.0	23.3	24.1	4.9	16.2
Clerical workers	10.6	0.7	6.8	6.8	3.2	19.5	16.6	9.2	39.0	8.8	44.6
Sales workers	7.3	0.1	3.7	0.3	0.3	0.6	22.1	27.7	26.9	0.6	0.1
Craftsmen and foremen	12.8	1.5	15.0	26.1	56.1	21.9	7.8	8.2	1.8	6.9	5.3
Operatives	19.6	2.3	50.1	50.7	12.1	34.9	23.0	12.5	0.3	6.1	2.5
Laborers, except farm	6.4	-	14.1	-	15.5	9.5	6.5	2.8	1.7	2.5	2.2
Service workers	14.0	0.3	1.6	1.9	0.4	1.7	0.9	15.0	4.0	40.4	15.7
Farmers and farm workers	9.6	92.3	-	-	-	-	-	-	-	-	-
Total employment	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: Percents may not sum to 100.0 due to rounding.

TABLE X-C

ARKANSAS EMPLOYMENT ESTIMATES, BY MAJOR OCCUPATIONAL GROUPS, BY MAJOR INDUSTRY CATEGORIES, 1970

Occupation	Total	Agriculture	Manufacturing	Mining	Contract Construction	Transportation, Communications & Utilities	Trade		Finance	Services	Public Administration
							Wholesale	Retail			
Professional and technical workers	72,046	973	6,284	386	2,145	1,627	358	1,378	544	53,985	4,366
Managers, officials and proprietors	68,719	816	9,648	343	4,595	3,143	5,543	24,548	6,451	8,608	5,024
Clerical workers	77,654	408	12,285	349	1,771	7,559	4,296	11,040	9,924	17,033	12,989
Sales workers	51,407	74	6,695	14	142	251	5,571	30,901	6,717	1,001	41
Craftsmen and foremen	92,580	1,015	26,986	1,285	28,359	8,702	2,243	9,650	471	12,251	1,612
Operatives	146,035	1,333	89,538	2,402	6,896	14,486	5,915	14,624	75	10,072	694
Laborers, except farm	42,466	-	21,504	-	7,456	3,521	1,535	3,045	411	4,399	595
Service workers	97,785	173	2,660	91	226	631	209	17,354	827	70,725	4,889
Farmers and farm workers	49,408	49,408	-	-	-	-	-	-	-	-	-
Total employment	698,100	54,200	175,600	4,870	51,590	39,920	25,670	112,540	25,420	178,080	30,210
	Percent Distribution										
Professional and technical workers	10.3	1.8	3.6	7.9	4.2	4.1	1.4	1.2	2.1	30.3	14.5
Managers, officials and proprietors	9.8	1.5	5.5	7.0	8.9	7.9	21.6	21.8	25.4	4.8	16.6
Clerical workers	11.1	0.8	7.0	7.2	3.4	18.9	16.7	9.8	39.0	9.6	43.0
Sales workers	7.4	0.1	3.8	0.3	0.3	0.6	21.7	27.5	26.4	0.6	0.1
Craftsmen and foremen	13.3	1.9	15.4	26.4	55.0	21.8	8.7	8.6	1.9	6.9	5.3
Operatives	20.9	2.5	51.0	49.3	13.4	36.3	23.0	13.0	0.3	5.7	2.3
Laborers, except farm	6.1	-	12.2	-	14.5	8.8	6.0	2.7	1.6	2.5	2.0
Service workers	14.0	0.3	1.5	1.9	0.4	1.6	0.8	15.4	3.3	39.7	16.2
Farmers and farm workers	7.1	91.2	-	-	-	-	-	-	-	-	-
Total employment	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: Percents may not sum to 100.0 due to rounding.

TABLE X-D

ARKANSAS EMPLOYMENT ESTIMATES, BY MAJOR OCCUPATIONAL GROUPS, BY MAJOR INDUSTRY CATEGORIES, 1975

Occupation	Total	Agri-culture	Manufac-turing	Mining	Contract Construc-tion	Transpor-tation Communi-cations & Utilities	Trade		Finance	Services	Public Adminis-tration
							Whole-sale	Retail			
Professional and technical workers	82,771	1,025	8,066	411	2,459	1,803	452	1,529	644	61,107	5,275
Managers, officials and proprietors	75,486	761	11,321	325	5,125	3,217	6,154	25,585	7,865	9,380	5,753
Clerical workers	88,934	372	14,550	352	2,019	7,660	4,907	13,093	11,538	20,455	13,988
Sales workers	57,541	77	7,846	14	158	271	6,190	34,183	7,657	1,101	44
Craftsmen and foremen	103,131	1,045	32,157	1,252	29,616	9,048	2,823	11,313	555	13,504	1,818
Operatives	167,523	1,255	105,629	2,249	8,038	15,569	6,704	16,917	81	10,374	707
Laborers, except farm	42,818	-	21,310	-	7,370	3,360	1,594	3,283	455	4,872	574
Service workers	107,591	160	2,821	87	245	602	216	19,867	755	77,187	5,651
Farmers and farm workers	42,505	42,505	-	-	-	-	-	-	-	-	-
Total employment	768,300	47,200	203,700	4,690	55,030	41,530	29,040	125,770	29,550	197,980	33,810
	Percent Distribution										
Professional and technical workers	10.8	2.2	4.0	8.8	4.5	4.3	1.6	1.2	2.2	30.9	15.6
Managers, officials and proprietors	9.8	1.6	5.6	6.9	9.3	7.7	21.2	20.3	26.6	4.7	17.0
Clerical workers	11.6	0.8	7.1	7.5	3.7	18.4	16.9	10.4	39.0	10.3	41.4
Sales workers	7.5	0.2	3.9	0.3	0.3	0.7	21.3	27.2	25.9	0.6	0.1
Craftsmen and foremen	13.4	2.2	15.8	26.7	53.8	21.8	9.7	9.0	1.9	6.8	5.4
Operatives	21.8	2.7	51.9	47.9	14.6	37.5	23.1	13.5	0.3	5.2	2.1
Laborers, except farm	5.6	-	10.5	-	13.4	8.1	5.5	2.6	1.5	2.5	1.7
Service workers	14.0	0.3	1.4	1.9	0.4	1.5	0.7	15.8	2.6	39.0	16.7
Farmers and farm workers	5.5	90.1	-	-	-	-	-	-	-	-	-
Total employment	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: Percents may not sum to 100.0 due to rounding.

TABLE X-E

ARKANSAS EMPLOYMENT ESTIMATES, BY MAJOR OCCUPATIONAL GROUPS, BY MAJOR INDUSTRY CATEGORIES, 1980

Occupation	Total	Agri-culture	Manufac-turing	Mining	Contract Construc-tion	Transpor-tation, Communi-cations & Utilities	Trade		Finance	Services	Public Adminis-tration
							Whole-sale	Retail			
Professional and technical workers	95,128	1,092	9,972	424	2,747	1,979	559	1,680	747	69,660	6,268
Managers, officials and proprietors	81,989	738	12,898	300	5,588	3,284	6,754	26,248	9,375	10,293	6,511
Clerical workers	100,899	354	16,748	346	2,245	7,726	5,541	15,311	13,144	24,611	14,873
Sales workers	63,558	82	8,977	14	172	288	6,801	37,408	8,549	1,220	47
Craftsmen and foremen	113,344	1,095	37,162	1,191	30,279	9,392	3,478	13,091	641	14,987	2,028
Operatives	188,496	1,225	121,063	2,054	9,109	16,703	7,516	19,339	84	10,697	706
Laborers, except farm	41,554	-	19,694	-	7,090	3,186	1,622	3,496	494	5,439	533
Service workers	118,571	153	2,886	81	260	572	219	22,487	626	84,833	6,454
Farmers and farm workers	38,161	38,161	-	-	-	-	-	-	-	-	-
Total employment	841,700	42,900	229,400	4,410	57,490	43,130	32,490	139,060	33,660	221,740	37,420
	Percent Distribution										
Professional and technical workers	11.3	2.5	4.3	9.6	4.8	4.6	1.7	1.2	2.2	31.4	16.8
Managers, officials and proprietors	9.7	1.7	5.6	6.8	9.7	7.6	20.8	18.9	27.9	4.6	17.4
Clerical workers	12.0	0.8	7.3	7.9	3.9	17.9	17.1	11.0	39.1	11.1	39.7
Sales workers	7.6	0.2	3.9	0.3	0.3	0.7	20.9	26.9	25.4	0.6	0.1
Craftsmen and foremen	13.5	2.6	16.2	27.0	52.7	21.8	10.7	9.4	1.9	6.8	5.4
Operatives	22.4	2.9	52.8	46.6	15.8	38.7	23.1	13.9	0.3	4.8	1.9
Laborers, except farm	4.9	-	8.6	-	12.3	7.4	5.0	2.5	1.9	2.5	1.4
Service workers	14.1	0.4	1.3	1.8	0.5	1.3	0.7	16.2	1.5	38.3	17.2
Farmers and farm workers	4.5	89.0	-	-	-	-	-	-	-	-	-
Total employment	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: Percents may not sum to 100.0 due to rounding.

Requirements for blue-collar workers are expected to rise by more than 28 percent between 1965 and 1975. Among the blue-collar workers, the most rapid increase will be the operative classification (36 percent), while the number of craftsmen will rise more slowly (28 percent). The demand for laborers is expected to increase less than seven percent.

The need for service workers is expected to rise by about 22 percent, and a continued decline, of about 29 percent, is anticipated for farmers and farm workers.

If these projected changes in the occupational structure of Arkansas actually take place, by 1975:

(1) Around 40 percent of Arkansas' workers will be engaged in white-collar occupations.

(2) Almost 11 percent of the State's workers will be professional or technical personnel.

(3) Another 13 percent will be skilled craftsmen or foremen.

(4) Less than six percent of employment in the State will be farmers and farm workers.

Regional Projections

Table XI presents the employment estimates by major occupational groups for the eight Economic Development Districts in Arkansas for 1965 and 1975, with extension to 1980. Also shown are both the expansion and replacement needs over the 1965-1975 period, and the total annual average growth and replacement necessary to reach the projected 1975 levels.

As was true for the industry employment projections, forecasts of future occupational employment within the State's eight economic regions become too unreliable for detailed treatment. Therefore, these projections are limited to major occupational groups. The unrounded data in this table are also used for convenience and do not imply the accuracy indicated.

State Projections by Detailed Occupational Listings

Table XII presents the employment estimates for the State by detailed occupational listings for 1965 and 1975, with extensions to 1980. As was done for the major occupational groups shown in Table IX, both the expansion and replacement needed to reach the projected 1975 totals are given. Unrounded data are again used for convenience.

TABLE XI

ARKANSAS EMPLOYMENT ESTIMATES AND MANPOWER NEEDS, BY ECONOMIC DEVELOPMENT DISTRICTS, BY MAJOR OCCUPATIONAL GROUPS, 1965 AND 1975--WITH EMPLOYMENT EXTENDED TO 1980

Occupation	Employment 1965	Employment 1975	Manpower Needs, 1965-1975 Expansion	Replacement	Total	Annual Average	Employment Extended to 1980
NORTHWEST ARKANSAS EDD							
Professional and technical workers	5,792	9,190	3,398	1,448	4,846	485	11,128
Managers, officials, and proprietors	5,890	8,519	2,629	1,472	4,101	410	9,759
Clerical workers	6,343	10,051	3,708	1,586	5,294	529	12,009
Sales workers	4,310	6,435	2,125	1,078	3,203	320	7,488
Craftsmen and foremen	7,902	12,260	4,358	1,975	6,333	633	14,311
Operatives	12,932	21,875	8,943	3,233	12,176	1,218	26,261
Laborers, except farm	4,124	5,360	1,236	1,031	2,267	227	5,475
Service workers	8,115	11,592	3,477	2,029	5,506	551	13,384
Farmers and farm workers	8,312	7,068	1,244	2,078	834	83	6,885
Total employment	63,720	92,350	28,630	15,930	44,560	4,456	106,700
NORTH CENTRAL ARKANSAS EDD							
Professional and technical workers	3,621	4,899	1,278	905	2,183	218	5,653
Managers, officials, and proprietors	3,616	4,455	839	904	1,743	174	4,865
Clerical workers	3,852	5,222	1,370	963	2,333	234	5,959
Sales workers	2,639	3,370	731	660	1,391	139	3,744
Craftsmen and foremen	4,615	6,078	1,463	1,154	2,617	262	6,758
Operatives	6,773	9,817	3,044	1,693	4,737	474	11,288
Laborers, except farm	2,206	2,495	289	552	841	84	2,464
Service workers	5,133	6,310	1,177	1,283	2,460	246	6,965
Farmers and farm workers	6,735	4,764	-1,971	1,684	-287	-29	4,314
Total employment	39,190	47,410	8,220	9,798	18,018	1,802	52,010
NORTHEAST ARKANSAS EDD							
Professional and technical workers	10,064	11,828	1,764	2,516	4,280	428	12,974
Managers, officials, and proprietors	10,137	10,958	821	2,534	3,355	336	11,422
Clerical workers	10,812	12,857	2,045	2,703	4,748	475	13,982
Sales workers	7,357	8,199	842	1,839	2,681	268	8,670
Craftsmen and foremen	13,242	15,852	2,610	3,311	5,921	592	17,097
Operatives	20,542	28,465	7,923	5,135	13,058	1,306	32,248
Laborers, except farm	6,576	6,905	329	1,644	1,973	197	6,578
Service workers	14,091	14,712	621	3,523	4,144	414	15,249
Farmers and farm workers	21,699	15,174	-6,525	5,425	-1,100	-110	13,850
Total employment	114,520	124,950	10,430	28,630	39,060	3,906	132,070
SOUTHEAST ARKANSAS EDD							
Professional and technical workers	6,921	9,268	2,347	1,730	4,077	408	10,642
Managers, officials, and proprietors	7,008	8,371	1,363	1,752	3,115	312	9,033
Clerical workers	7,541	9,819	2,278	1,885	4,163	416	11,072
Sales workers	5,142	6,377	1,235	1,286	2,521	252	7,017
Craftsmen and foremen	9,297	11,127	1,830	2,324	4,154	415	11,898
Operatives	14,852	17,064	2,212	3,713	5,925	592	17,950
Laborers, except farm	4,771	4,455	-316	1,193	877	88	4,162
Service workers	9,757	12,143	2,386	2,439	4,825	483	13,517
Farmers and farm workers	9,041	6,466	-2,575	2,260	-315	-32	5,649
Total employment	74,330	85,090	10,760	18,582	29,342	2,934	90,940
SOUTHWEST ARKANSAS EDD							
Professional and technical workers	7,341	8,420	1,079	1,835	2,914	291	9,146
Managers, officials and proprietors	7,481	7,844	363	1,870	2,233	223	8,069
Clerical workers	8,115	9,300	1,185	2,029	3,214	321	9,972
Sales workers	5,536	5,957	421	1,384	1,805	181	6,214
Craftsmen and foremen	10,100	11,395	1,295	2,525	3,820	382	11,991
Operatives	16,676	20,695	4,019	4,169	8,188	819	22,509
Laborers, except farm	5,357	5,064	-293	1,339	1,046	105	4,660
Service workers	10,388	10,655	267	2,597	2,864	286	10,993
Farmers, and farm workers	4,336	3,350	-986	1,084	98	10	3,256
Total employment	75,330	82,680	7,350	18,832	26,182	2,618	86,810
WESTERN ARKANSAS EDD							
Professional and technical workers	5,434	8,382	2,948	1,358	4,306	431	10,065
Managers, officials, and proprietors	5,517	7,658	2,141	1,379	3,520	352	8,669
Clerical workers	5,984	9,057	3,073	1,496	4,569	457	10,704
Sales workers	4,094	5,870	1,776	1,024	2,800	280	6,761
Craftsmen and foremen	7,382	10,471	3,089	1,845	4,934	493	11,879
Operatives	11,954	17,070	5,116	2,988	8,104	810	19,497
Laborers, except farm	3,866	4,380	514	967	1,481	148	4,354
Service workers	7,731	10,966	3,235	1,933	5,168	517	12,685
Farmers and farm workers	2,398	1,576	-822	600	-222	-22	1,236
Total employment	54,360	75,430	21,070	13,590	34,660	3,466	85,850
WEST CENTRAL ARKANSAS EDD							
Professional and technical workers	5,669	7,378	1,709	1,417	3,126	313	8,397
Managers, officials, and proprietors	5,731	6,790	1,059	1,433	2,492	249	7,307
Clerical workers	6,198	8,031	1,833	1,550	3,383	338	9,019
Sales workers	4,247	5,179	932	1,062	1,994	199	5,661
Craftsmen and foremen	7,577	9,512	1,935	1,894	3,829	383	10,388
Operatives	11,976	16,218	4,242	2,994	7,236	724	18,179
Laborers, except farm	3,889	4,074	185	972	1,157	116	3,910
Service workers	8,082	9,516	1,434	2,021	3,455	345	10,353
Farmers and farm workers	3,441	2,512	-929	860	-69	-7	2,366
Total employment	56,810	69,210	12,400	14,203	26,603	2,660	75,580
CENTRAL ARKANSAS EDD							
Professional and technical workers	16,938	23,406	6,468	4,234	10,702	1,070	27,123
Managers, officials, and proprietors	16,683	20,891	4,208	4,171	8,379	838	22,865
Clerical workers	17,901	24,597	6,696	4,475	11,171	1,117	28,182
Sales workers	12,482	16,154	3,672	3,121	6,793	679	18,003
Craftsmen and foremen	20,526	26,436	5,910	5,131	11,041	1,104	29,022
Operatives	27,152	36,319	9,167	6,788	15,955	1,596	40,564
Laborers, except farm	9,309	10,085	776	2,327	3,103	310	9,951
Service workers	24,851	31,697	6,846	6,213	13,059	1,306	35,425
Farmers and farm workers	4,098	1,595	-2,503	1,025	-1,478	-148	605
Total employment	149,940	191,180	41,240	37,485	78,725	7,872	211,740

TABLE XII

ARKANSAS EMPLOYMENT ESTIMATES AND MANPOWER NEEDS, BY DETAILED OCCUPATIONAL LISTINGS, 1965 AND 1975 - WITH EMPLOYMENT EXTENDED TO 1980

Occupation	Employment 1965	Employment 1975	Manpower Needs, 1965-1975 Expansion	Replacement	Total	Annual Average	Employment Extended to 1980
Total employment	628,200	768,300	140,100	157,050	297,150	29,715	841,700
Professional, technical and kindred	61,780	82,771	20,991	15,445	36,436	3,644	95,128
Engineers, technical	3,187	4,816	1,629	797	2,426	243	5,799
Engineers, aeronautical	27	51	24	7	31	3	68
Engineers, chemical	181	268	87	45	132	13	321
Engineers, civil	1,126	1,641	515	82	797	80	1,941
Engineers, electrical	561	816	255	140	395	39	952
Engineers, industrial	337	565	228	84	312	31	722
Engineers, mechanical	354	520	166	89	255	26	611
Engineers, metallurgical	21	33	12	5	17	2	40
Engineers, mining	67	67	-	17	17	2	67
Other engineers, technical	513	855	342	128	470	47	1,077
Natural scientists	886	1,410	524	221	745	74	1,756
Chemists	443	737	294	110	404	40	935
Agricultural scientists	114	168	54	28	82	8	200
Biological scientists	108	183	75	27	102	10	232
Geologists and geophysicists	155	205	50	39	89	9	235
Mathematicians	31	64	33	8	41	4	91
Physicists	7	12	5	2	7	1	15
Other natural scientists	28	41	13	7	20	2	48
Technicians, except medical & dental	3,475	5,541	2,066	869	2,935	293	6,987
Draftsmen	683	960	277	171	448	45	1,138
Surveyors	710	1,067	357	177	534	53	1,307
Air traffic controllers	106	114	8	27	35	3	118
Radio operators	194	265	71	49	120	12	305
Technicians, other	1,782	3,135	1,353	445	1,798	180	4,119
Medical & other health workers	11,396	14,974	3,578	2,849	6,427	643	16,942
Dentists	621	720	99	155	254	25	762
Dietitians & nutritionists	318	360	42	80	122	12	378
Nurses, professional	5,026	6,487	1,461	1,256	2,717	272	7,233
Nurses, student	188	168	-20	47	27	3	154
Optometrists	138	155	17	35	52	5	162
Osteopaths	9	10	1	2	3	-	10
Pharmacists	926	971	45	231	276	28	979
Physicians & surgeons	1,999	2,536	537	500	1,037	104	2,796
Psychologists	54	85	31	14	45	5	104
Technicians, medical & dental	1,438	2,540	1,102	359	1,461	146	3,274
Veterinarians	96	113	17	24	41	4	120
Chiropractors & therapists	583	829	246	146	392	39	970
Teachers	22,282	28,419	6,137	5,570	11,707	1,171	31,711
Teachers, elementary	11,174	12,582	1,408	2,793	4,201	420	13,195
Teachers, secondary	6,909	9,511	2,602	1,727	4,329	433	10,926
Teachers, other except college	2,257	3,199	942	564	1,506	151	3,721
Teachers, college	1,942	3,127	1,185	486	1,671	167	3,864
Social scientists	159	224	65	40	105	11	265
Economists	59	78	19	15	34	4	89
Statisticians & actuaries	85	122	37	21	58	6	146
Other social scientists	15	24	9	4	13	1	30
Other professional, technical & kindred	20,395	27,387	6,992	5,099	12,091	1,209	31,668
Accountants & auditors	2,581	3,175	594	645	1,239	124	3,495
Airplane pilots & navigators	232	301	69	58	127	13	338
Architects	131	160	29	33	62	6	174
Artists, athletes, entertainers	3,426	4,528	1,102	856	1,958	196	5,137
Clergymen	3,800	3,975	175	950	1,125	112	4,008
Designers, except design draftsmen	175	254	79	44	123	12	303
Editors & reporters	560	644	84	140	224	22	674
Lawyers & judges	1,643	1,861	218	411	629	63	1,951
Librarians	853	1,100	247	213	460	46	1,225
Personnel & labor relation workers	766	1,046	280	192	472	47	1,199
Photographers	284	294	10	71	81	8	297
Social & welfare workers	857	1,328	471	214	685	69	1,643
Professional, technical workers, n.e.c.	5,087	8,721	3,634	1,272	4,906	491	11,224
Managers, officials & proprietors	62,063	75,486	13,423	15,516	28,939	2,894	81,989
Conductors, railroad	292	306	14	73	87	9	308
Creditmen	382	641	259	96	355	35	823
Officers, pilots, engineers, ship	232	246	14	58	72	7	252
Purchasing agents	697	1,119	422	174	596	60	1,416
Postmasters & assistants	813	703	-110	203	93	9	644
Managers, officials, proprietors, n.e.c.	59,647	72,471	12,824	14,912	27,736	2,774	78,546
Clerical & kindred workers	66,746	88,934	22,188	16,687	38,875	3,887	100,899
Stenographers, typists & secretaries	14,193	19,504	5,311	3,548	8,859	886	22,645
Office machine operators	1,239	2,346	1,107	310	1,417	142	3,206
Other clerical & kindred workers	51,314	67,084	15,770	12,829	28,599	2,860	75,048
Accounting clerks & bookkeepers	9,888	12,163	2,275	2,472	4,747	475	13,148
Bank tellers	1,069	1,780	711	267	978	98	2,254
Cashiers	4,233	6,741	2,508	1,059	3,567	357	8,313
Mail carriers	2,461	3,105	644	615	1,259	126	3,418
Postal clerks	1,933	1,982	49	483	532	53	1,982
Shipping & receiving clerks	1,908	2,249	341	477	818	82	2,393
Telephone operators	2,357	2,530	173	589	762	76	2,549
Clerical & kindred workers, n.e.c.	27,465	36,534	9,069	6,867	15,936	1,593	40,991

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TABLE XII
ARKANSAS EMPLOYMENT ESTIMATES . . . . WITH EMPLOYMENT EXTENDED TO 1980 - (Continued.)

Occupation	Employment 1965	Employment 1975	Manpower Needs, 1965-1975 Expansion	Replacement	Total	Annual Average	Employment Extended to 1980
Sales workers	45,807	57,541	11,734	11,452	23,186	2,319	63,558
Insurance agents & brokers	3,548	4,480	932	887	1,819	182	4,901
Real estate agents & brokers	1,614	2,200	586	404	990	99	2,505
Other sales workers, n.e.c.	40,645	50,861	10,216	10,161	20,377	2,038	56,152
Craftsmen, foremen & kindred workers	80,641	103,131	22,490	20,160	42,650	4,265	113,344
Construction craftsmen	28,161	33,682	5,521	7,040	12,561	1,256	35,585
Carpenters	12,803	14,285	1,482	3,201	4,683	468	14,476
Brickmasons, stone, tile setters	1,474	1,744	270	368	638	64	1,847
Cement & concrete finishers	448	656	20[e]	112	320	32	761
Electricians	2,349	2,879	530	587	1,117	112	3,075
Excavating, grading machine operators	3,859	5,463	1,604	965	2,569	257	6,281
Painters & paperhangers	3,723	4,118	395	931	1,326	132	4,147
Plasterers	182	219	37	46	83	8	235
Plumbers & pipefitters	2,608	3,318	710	652	1,362	136	3,620
Roofers & slaters	349	459	110	87	197	20	512
Structural metalworkers	366	541	175	91	266	27	631
Foremen, n.e.c.	9,938	13,751	3,813	2,484	6,297	630	15,846
Metalworking craftsmen, except mechanics	4,447	5,216	769	1,112	1,881	188	5,458
Skilled machining workers	2,209	2,558	349	552	901	90	2,658
Blacksmiths, forgemen, hammermen	428	329	-99	107	8	1	275
Boilermakers	192	232	40	48	88	9	245
Heat treaters, annealers, tempers	15	18	3	4	7	1	19
Millwrights	667	875	208	167	375	37	957
Molders, metal except coremakers	63	76	13	16	29	3	81
Patternmakers, metal & wood	43	62	19	11	30	3	71
Rollers & roll hands	19	24	5	5	10	1	26
Sheet metalworkers	562	732	170	140	310	31	794
Toolmakers, diemakers, setters	249	310	61	62	123	12	332
Mechanics & repairmen	23,470	32,663	9,193	5,868	15,061	1,506	37,419
Airplane mechanics & repairmen	210	262	52	53	105	11	284
Motor vehicles mechanics	8,858	10,639	1,781	2,214	3,995	399	11,289
Office machine mechanics	298	463	165	75	240	24	570
Radio & TV mechanics	1,039	1,213	174	260	434	43	1,287
Railroad & car shop mechanics	335	361	26	84	110	11	364
Other mechanics & repairmen	12,730	19,725	6,995	3,182	10,177	1,018	23,625
Printing trades craftsmen	1,613	1,968	355	403	758	76	2,100
Compositors & typesetters	1,055	1,128	73	263	336	34	1,128
Electrotypers & sterotypers	39	32	-7	10	3	-	27
Engravers, except photoengravers	51	77	26	13	39	4	89
Photoengravers & lithographers	87	181	94	22	116	12	248
Pressmen & plate printers	381	550	169	95	264	26	608
Transportation & public utility craftsmen	3,715	4,028	313	929	1,242	124	4,113
Linemen & servicemen	2,857	3,326	469	714	1,183	118	3,451
Locomotive engineers	578	619	41	145	186	19	619
Locomotive firemen	280	83	-197	70	-127	-13	43
Other craftsmen & kindred workers	9,297	11,823	2,526	2,324	4,850	485	12,823
Bakers	551	526	-25	138	113	11	491
Cabinetmakers	511	608	97	128	225	23	629
Cranemen, derrickmen, hoistmen	663	957	294	166	460	46	1,108
Glaziers	148	223	75	37	112	11	265
Jewelers & watchmakers	370	437	67	92	159	16	450
Loom fixers	14	15	1	4	5	1	15
Millers	122	105	-17	30	13	1	93
Opticians & lens grinders	63	71	8	16	24	2	71
Stationary engineers	1,933	1,970	37	483	520	52	2,167
Inspectors, log & lumber	1,487	2,067	580	372	952	95	2,312
Inspectors, other	782	1,087	305	195	500	50	1,217
Upholsterers	811	1,305	494	203	697	70	1,586
Craftsman & kindred workers, n.e.c.	1,842	2,452	610	460	1,070	107	2,419
Operatives & kindred workers	122,857	167,523	44,666	30,714	75,380	7,538	188,496
Selected transportation & utility operators	30,647	41,978	11,331	7,662	18,993	1,899	49,157
Drivers, bus, truck, tractor & deliverymen, routemen, cab drivers	28,832	39,760	10,928	7,208	18,136	1,814	46,730
Brakemen & switchmen, railroad	1,422	1,741	319	355	674	67	1,905
Power station operators	227	275	48	57	105	10	300
Sailors & deck hands	166	202	36	42	78	8	222
Semiskilled metalworking occupations	9,693	13,557	3,864	2,423	6,287	629	15,517
Assemblers, metalworking class A & B	2,926	4,178	1,252	731	1,983	198	4,840
Furnacemen, sheltermen, pourers & heaters	144	242	98	36	134	14	305
Machine tool operators, class B	2,003	2,490	487	501	988	99	2,665
Inspectors, metalworking class B	1,488	2,118	630	372	1,002	100	2,462

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TABLE XII
ARKANSAS EMPLOYMENT ESTIMATES . . . . WITH EMPLOYMENT EXTENDED TO 1980 - (Continued.)

Occupation	Employment 1965	Employment 1975	Manpower Needs, 1965-1975 Expansion	Replacement	Total	Annual Average	Employment Extended to 1980
Welders & flame cutters	2,871	4,156	1,285	718	2,003	200	4,819
Electroplaters	96	144	48	24	72	7	168
Electroplater helpers	165	229	64	41	105	11	258
Semiskilled textile occupations	5,653	7,421	1,768	1,413	3,181	318	8,177
Knitters, loopers & toppers	155	191	36	39	75	7	203
Spinners, textile	63	53	-10	16	6	1	47
Weavers, textile	93	83	-10	23	13	1	75
Sewers & stitchers manufacturing	5,342	7,094	1,752	1,335	3,087	309	7,852
Asbestos & insulation workers	101	145	44	25	69	7	164
Other operatives & kindred workers	76,763	104,422	27,659	19,191	46,850	4,685	115,481
Attendants, automobile parking	5,394	7,440	2,046	1,349	3,395	339	8,351
Blasters & powdermen	46	45	-1	12	11	1	43
Laundry & dry cleaning workers	4,413	4,237	-176	1,103	927	93	4,022
Mine operatives & laborers, n.e.c.	2,349	1,777	-572	587	15	2	1,487
Meat cutters, except meatpacking	1,653	2,057	404	413	817	82	2,213
Other operatives, n.e.c.	62,908	88,866	25,958	15,727	41,685	4,168	99,365
Laborers, except farm & mine	40,098	42,818	2,720	10,024	12,244	1,274	41,554
Service workers	88,148	107,591	19,443	22,037	41,480	4,148	118,571
Private household workers	30,230	32,454	2,224	7,557	9,781	978	33,338
Protective service workers	5,208	6,697	1,489	1,302	2,791	279	7,594
Firemen, fire protection	936	1,167	231	234	465	46	1,300
Policemen, marshals, sheriffs	2,251	3,158	907	563	1,470	147	3,723
Guards, watchmen	2,021	2,372	351	505	856	86	2,571
Waiters, cooks, & bartenders	18,328	24,220	5,892	4,582	10,474	1,047	27,511
Bartenders	187	239	52	47	99	10	263
Cooks, except private household	8,466	11,023	2,557	2,116	4,673	467	12,425
Counter & fountain workers	1,243	1,871	628	311	939	94	2,266
Waiters & waitresses	8,432	11,087	2,655	2,108	4,763	476	12,557
Other service workers	34,382	44,220	9,838	8,596	18,434	1,844	50,128
Airline stewards, stewardesses	40	67	27	10	37	4	88
Attendants, hospital & other insitutions	6,895	10,866	3,971	1,724	5,695	569	13,534
Charwomen, cleaners, janitors & sextons	7,236	8,293	1,057	1,809	2,866	287	8,932
Nurses, practical	2,842	4,058	1,216	711	1,927	193	4,833
Other service workers, n.e.c.	17,369	20,936	3,567	4,342	7,909	791	22,741
Farmers & farm workers	60,060	42,505	-17,555	15,015	-2,540	-254	38,161

While employment in the professional, technical and kindred workers occupational group is expected to increase rapidly over the 1965-1975 decade, Arkansas will still not grow as fast as the Nation in these occupations. The State is expected to be most deficient in the medical field; with dentists, professional nurses, physicians and surgeons, medical and dental technicians and veterinarians being especially short. Other marked shortage areas will be teachers and clergymen.

Over the decade, employment in all other occupational groups, except service workers, and farmers and farm workers, is expected to increase more rapidly than the Nation. Especially high growth should occur in the clerical, craftsmen, and operatives categories.

Employment of service workers will grow more slowly than national employment in these occupations, while employment in the farmer and farm worker category will decline more rapidly than is true for the Nation. This should cause the State's employment in the service occupations to approximate the national pattern as a percent of total employment in 1975, and bring the State much closer to the national mix (percent of total employment) in the farm occupations.

In reviewing the projected employment by detailed occupations, the reader must do more than simply consider the raw data as presented. For example, there is an immediate tendency to question the fact that student nurses are projected to decrease in number at the same time that the employment of professional nurses is projected to increase; this apparent incongruity is due to changes in training methods. In the past, most professional nurses took their training at the hospital and were listed as student nurses, whereas most students now planning a career in professional nursing are enrolling in college degree programs or associate degree programs and are not counted as part of the labor force.

Also, when comparing changes in the overall occupational structure by time periods it must be remembered that not only are the occupational needs within industries changing, but that the industry mix in the State is changing at the same time, e.g., relatively more metalworking, chemical and plastics manufacturing than in the past.

PROJECTION METHODS

Employment Projections by Industry

The methodology employed by the Industrial Research and Extension Center in obtaining the projections in Tables VI and VII was somewhat different from that used in most previous State projections of this nature. The first step was to make descriptive computer runs for complete quarterly ESD data from 1950 through 1967, for all industries as well as for the work force, total manufacturing (durables and nondurables), total services, and other major nonmanufacturing industrial categories. Linear trends were then plotted for all series to provide reference points in identifying breaks in the series. From these initial runs, points were selected from which to begin the various projections.

The second step consisted of projecting the quarterly data from the selected beginning points by linear regression: $Yc = A + BX$; log linear: $\log Yc = \log A + \log BX$; Gompertz: $Yc = KA(BX)$; and Pearl-Reed: $Yc = K[1 + E(A + BX)]$. The projections were then plotted graphically.

From these results, the projection providing the "best fit" for each industry was selected and the total of all industries was then adjusted to work force and major industry category totals. The results of this operation were then compared to the national projections given in Tomorrow's Manpower Needs, Bureau of Labor Statistics, U. S. Department of Labor. Modifications were made industry by industry in view of the national trends, as well as past experiences in Arkansas and other developing states in the South, e.g., the movement of declining industries such as textiles into the South.

These data were then adjusted downward to fit independently projected population and work force data for Arkansas, and became the first approximations for a forecast.

A careful review and further comparison with national trends was made at this point by the IREC staff members, and by the staff of the Reports and Analysis Section of the State Employment Security Division.

The final forecast was made incorporating adjustments developed from the reviews, but remaining within the confines of projected labor force data. These final data are considered a best estimate of the employment that can be expected in Arkansas in 1980.

The employment projections for Arkansas are based primarily on historical data, and assumptions similar to those used for the national projections. Thus relatively comparability with national data is achieved.

The general assumptions providing the parameters for the industry projections are:

(1) That general economic progress in both Arkansas and the Nation will continue as in the recent past.

(2) That the State will continue to exert strong efforts toward expanding and diversifying its economy, with continued emphasis on manufacturing and new emphasis on the leisure industry.

(3) That the State will continue to become more like the Nation in its industrial mix and structure.

(4) There will be a continuation of scientific and technological advances.

(5) That no major natural catastrophe, social upheaval, or war of significant intensity and duration will upset the State's long-term development.

Employment Projections by Occupation

The preparation of Arkansas' occupational projections was accomplished through use of the national industry-occupational matrices published in Tomorrow's Manpower Needs, previously cited. The method used was the BLS "Area Projection Method B" which required the development of an Arkansas base period (1960) industry-occupational matrix.

After the development of the Arkansas base period matrix, a target year (1975) matrix was then computed by applying the trends (1960-1975) projected for industry-occupational structures at the national level to the corresponding industries in the State base period (1960) matrix. Initial 1975 State occupational employment estimates were then made by applying the 1975 State occupational-industry matrix to projected State industry employment, and aggregating the results to obtain State occupational totals. These were then reviewed and adjusted in cases where obviously unreasonable results appeared.

The need to replace experienced workers who die, retire, or leave the labor force for other reasons is an even more important determinant of worker requirements in some occupations than are expansion needs. Therefore, some estimate of these replacement needs had to be made. The method used here is considered quite conservative; it was simply to assume a normal working life of 40 years for all presently employed persons. Thus a 2.5 percent average annual replacement rate was used. This assumption is considered valid for men, but few females actually work this many years. In addition to retirements and deaths, females withdraw from the work force as a result of marriage, child bearing, presence of young children in the home, etc. Therefore, somewhat higher female worker replacement needs should cause the total estimated replacement needs shown in the tables to be conservative.

Finally, since the projected expansion needs run only to 1975 for consistency with available national occupational projections, the State's 1960-1975 trends were extended to 1980 in order to provide planning information for the longer period.

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